



DAFFODIL INSTITUTE OF IT (DIIT)
BBA (Honours) in Tourism and Hospitality Management (THM)
Third Year Sixth Semester
Fundamentals of Finance
Chapter- 3
Time Value of Money and its Application (Math)

Problem-5

Find the future value of the following investment:

The interest rate is 8% percent per year compounded annually. Tk 100 is invested each year beginning one year from now and continuing through year 10. The proceeds are to be withdrawn in year 10.

Solution: Given,

$$R = 0.08$$

$$A = 100$$

$$n = 10 \text{ yrs.}$$

$$FV = ?$$

We know,

$$FV = \frac{A\{(1+R)^n - 1\}}{R}$$

$$FV = \frac{100\{(1+0.08)^{10} - 1\}}{0.08}$$

$$FV = 1448.65 \text{ Ans.}$$

Problem-6

What is the present value of the following cash-flows at an interest rate of 12 percent per year: Tk 100 received each year beginning one year from now and ending 10 years from now.

Solution: Given,

$$R = 0.12$$

$$A = 100$$

$$n = 10 \text{ yrs.}$$

$$PV = ?$$

We know,

$$PV_a = A \left[\frac{1}{R} - \frac{1}{R(1+R)^n} \right]$$

$$PV_a = 100 \left[\frac{1}{.12} - \frac{1}{.12(1+.12)^{10}} \right]$$

PV= 565 Ans.

Problem-7

If you wish to have Tk 10,000 ten years from now, how much money must you invest today in a saving certificate that pays 8 percent per year?

Solution: Given,

$$FV = 10,000$$

$$n = 10 \text{ yrs.}$$

$$R = 0.08$$

Requirement: Present Value (PV) =?

$$PV = FV \div (1+R)^n$$

$$PV = 10000 \div (1+0.08)^{10}$$

$$\therefore PV = 4,632 \text{ Ans.}$$

Problem-8

BTI has been doing real estate business for last 20 years, you have selected an apartment of BTI at Green Road costing Tk 25 lakh. You have three alternative offers:

- (i) Pay full in cash.
- (ii) Pay 25% of the cost in cash immediately and pay Tk 2.25 lakh in each instalment for next ten years.
- (iii) Pay 40% of the cost in cash and take a loan of Tk 15 lakh from HBFC at 15% interest to be paid in equal monthly instalment over a next 20 years.

Which offer should you accept if opportunity cost is 12%.

Solution: Given,

$$N = 20 \text{ yrs.}$$

$$PV = 25,00,000$$

$$R = 0.12$$

Requirement: Present Value (PV) =?

Alternative (i): Present Value (PV) = 25,00,000

$$\begin{aligned}
\text{Alternative (ii): PV} &= \text{Cash down payment} + A \left[\frac{1}{R} - \frac{1}{R(1+R)^n} \right] \\
&= 2500000 \times 25\% + 2,25,000 \left[\frac{1}{0.12} - \frac{1}{0.12(1+0.12)^{10}} \right] \\
&= 6,25,000 + 1271300 \\
&= 18,96,300
\end{aligned}$$

$$\begin{aligned}
\text{Alternative (iii): Alternative (ii): PV} &= \text{Cash down payment} + A \left[\frac{1}{R} - \frac{1}{R(1+R)^n} \right] \\
&= 2500000 \times 40\% + 19,752 \left[\frac{1}{0.12 \div 12} - \frac{1}{0.12 \div 12 (1+0.12 \div 12)^{20 \times 12}} \right] \\
&= 1000000 + 19752 \left[\frac{1}{0.01} - \frac{1}{0.01(1+0.01)^{240}} \right] \\
&= 10,00,000 + 17,93,865 \\
&= 27,93,865
\end{aligned}$$

Note: Here, the instalment for HBFC will be as under:

$$\begin{aligned}
\text{PV} &= A \left[\frac{1}{R} - \frac{1}{R(1+R)^n} \right] \\
\Rightarrow 15,00,000 &= A \left[\frac{1}{0.15 \div 12} - \frac{1}{0.15 \div 12 (1+0.15 \div 12)^{20 \times 12}} \right] \\
\Rightarrow 15,00,000 &= A \left[\frac{1}{0.0125} - \frac{1}{0.0125(1+0.0125)^{240}} \right] \\
\Rightarrow 1500000 &= A (75.9423) \\
\Rightarrow A (75.9423) &= 1500000 \\
\Rightarrow A &= 1500000 \div (75.9423) \\
\therefore A &= 19752
\end{aligned}$$

Decision: Since alternative (ii) has the lowest PV (cost), so it should be accepted.

Problem- 9

Mr. Zahid plans to send his son for higher studies abroad after 10 years. He expects the cost of these studies to be Tk 10,00,000. How much should he save annually to have a sum of Tk10,00,000 at the end of 10 years, if the interest rate is 12 percent?

Solution: Given,

$$FV = 10,00,000$$

n= 10 yrs.

R= 0.12

(A)= ?

We know,

$$FVa = \frac{A\{(1+R)^n - 1\}}{R}$$

$$\Rightarrow 1000000 = \frac{A\{(1+.12)^{10} - 1\}}{.12}$$

$$\Rightarrow 1000000 = \frac{A\{2.1058\}}{.12}$$

$$\Rightarrow 1000000 = A (17.5487)$$

$$\Rightarrow A (17.5487) = 1000000$$

$$= A (17.5487) = 1000000 \div 17.5487$$

$$\therefore A = 56984.1641 \text{ Ans.}$$
